

tions lasted at Teplitz Bay from September 1, 1903, to April 30, 1904, and at Cape Flora from May 21, 1904, to July 30, 1905. Taking the mean of the three daily readings, the monthly mean temperature varied at Cape Flora from $-19^{\circ}9$ F. in January to $+35^{\circ}6$ in July; at Teplitz Bay, March had the lowest mean temperature, $-19^{\circ}7$ F. At Cape Flora, the precipitation during the year ending with May, 1905, was equivalent to 21.37 inches of rain. A recording thermograph and barograph were in action at Teplitz Bay from October, 1903, to April, 1904, and a barograph was run at Cape Flora from June, 1904, to May, 1905. From the records of these instruments diurnal inequalities are deduced for individual months, and Fourier coefficients calculated. Taking arithmetic means from individual months, the amplitudes (in thousandths of an inch) of the three first terms in the case of the barometric pressure were:—

	24-hour	12-hour	8-hour
Teplitz Bay (winter)...	14	6	3
Cape Flora (year) ...	13	5	3

Tidal observations were made at Teplitz Bay from April 1 to June 3, 1904, and at Cape Flora from May 21 to August 31, 1904. Readings, to 0.01 foot, were taken on a tide staff once an hour, usually throughout the whole twenty-four hours. Fig. 2, reproduced from p. 493, shows the arrangements at Teplitz Bay. The wooden frame

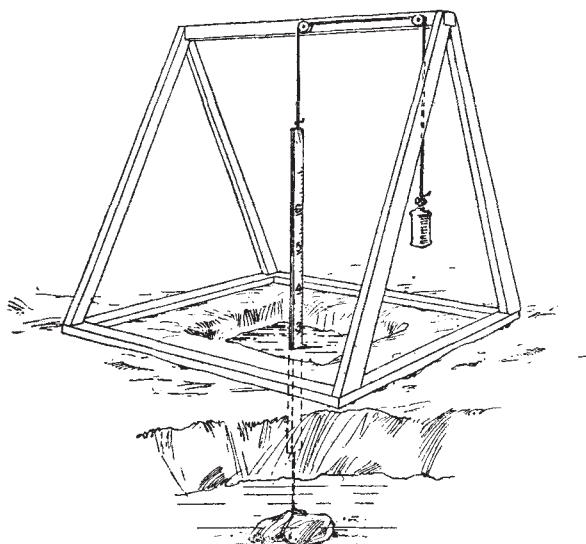


FIG. 2.—Tide Gauge at Teplitz Bay.

rose and fell with the ice it rested on, the heavy stone remaining on the sea bottom. There is an elaborate harmonic analysis of the data, following generally the methods of Sir G. H. Darwin. The mean difference between high-water and low-water level was fairly similar at the two stations, being 1.138 feet at Teplitz Bay and 0.966 foot at Cape Flora. There was, however, a difference of $3\frac{1}{2}$ hours in the "establishment of the port" at the two places, and the conclusion is drawn (p. 596) that the tide from the Atlantic reaches Franz Josef Land by two channels, the deeper, between Spitsbergen and Greenland, chiefly influencing Teplitz Bay, the other, between Spitsbergen and Norway, chiefly influencing Cape Flora.

The astronomical observations served to fix the latitude and longitude of the stations and the azimuths of the declination marks. Considerable care was evidently given to them, but they call for no special remark.

As will have already been inferred, one can have nothing but praise for the zeal displayed. Magnetic observers who took observations at two-minute intervals for eight hours on end, at temperatures below 0° F., cannot be accused of treating Arctic exploration as a pretence for a picnic. It may also be added that no trouble has been spared in making the most of the material collected. Valuable, however, as the results are, they must be accepted with

several reservations. As the dates will have shown, the series of observations, especially the tidal ones, were short, and the representative nature of the results is thus exposed to more or less doubt. This consideration cannot but suggest itself to anyone who examines some of the data critically. Taking, for instance, the mean monthly data from the thermograph record at Teplitz Bay, we find that in March the 10 p.m., midnight, and 2 a.m. readings are the only ones of the two-hour readings to exceed the mean for the day, the maximum coming at 2 a.m.; but in April these are the precise hours to which the lowest temperatures are attached. Again, the diurnal inequality range is $3^{\circ}3$ in January, in the depth of the Arctic night, but only $0^{\circ}8$ in October. In the case of the magnetic data, there are other sources of uncertainty. There was appreciable local disturbance both at Teplitz Bay and Alger Island, and its precise effect, though probably not large, cannot be assigned. After the return of the magnetometer to America it was found that a cloth hood, believed to have been fastened to the end of the magnet box in 1899, had been attached with steel tacks. Observations at Cheltenham showed no effect on the declination, but a decrease of 250γ ($1 \gamma = 0.0001$ C.G.S.) in the horizontal force. A correction of $+255 \gamma$ (or nearly 4 per cent.) was thence calculated and applied to observations made in the Arctic. In the case of the dip circle comparisons at Cheltenham before the expedition gave for the two needles corrections of only $+0^{\circ}2$ and $-0^{\circ}3$, but the corresponding corrections obtained after the expedition were $-4^{\circ}1$ and $-5^{\circ}6$.

In view of these uncertainties, and the lack of direct information as to diurnal change, the deductions made as to secular changes of horizontal force and inclination at Teplitz Bay by comparison with the results of the Italian observers for 1900 should be regarded with reserve.

Again, at Teplitz Bay there were only nine months' magnetic observations, and the deductions of diurnal inequalities for the three missing months, and thence for the year as a whole, are of somewhat doubtful value.

The deficiencies referred to are such as attach more or less to most expeditions, and there are probably few Polar observations which are not affected by at least as serious uncertainties. There are many points in connection with the observational programme and its execution which merit the attention of those contemplating magnetic or meteorological work in high latitudes.

C. CHREE.

SANATORIA FOR CONSUMPTION.

AS a supplement to the thirty-fifth annual report of the Local Government Board, Dr. Bulstrode has published an imposing volume on "Sanatoria for Consumption and certain other Aspects of the Tuberculosis Question." This report, copiously illustrated by photographs, plans, and charts, extends to 700 pages, and is an admirable exposition of the present position of the problem of prevention of tuberculosis.

In part i. is set forth a general review of the changes which have taken place in medical opinion as to the etiology of tuberculosis and as to the mode of its invasion of the human body.

The theory of infection by inhalation of dust infected by dried sputum, and the evidence on which it is based, is reviewed; also the theory of von Behring that infection can be usually traced to the ingestion of tuberculous milk in infancy, remaining latent until some debilitating influence causes the focus of infection to light up to the undoing of the organism. Calmette's theory that direct infection occurs mainly by the ingestion of food tainted by droplets of infective expectoration is also discussed, and finally we have the conclusions of the Royal Commission on Tuberculosis, that a material amount of human tuberculosis is attributable to infection of the intestinal tract by "tubercle of bovine origin."

The proportion of tuberculosis due to this source, unfortunately, has never been definitely ascertained, but the pronouncement of the Royal Commission is important in the light of Koch's dogmatic statements as to the essential difference between human and bovine tubercle, and all this difference entails.

Dr. Bulstrode gives us many tables of statistics which prove the gradual but steady diminution of tuberculosis, and emphasise the curious phenomenon that this declension is much more marked among females.

In this satisfactory state of affairs sanitary reform, improved conditions of living, and higher wages have all played their part, but the report does not help us much to estimate the relative value of the various methods of attacking the disease which have been tried.

The difficulty of estimating the value of sanatorium treatment is brought out, and we are told that until this method has had a longer trial figures of results will only lead to confusion and misconception.

Stress is, however, laid on the fact that to obtain the best results from sanatorium treatment cases of tuberculosis must be treated in their earliest stages, and further, that after treatment an easy path of suitable work must be provided until a life of full activity can be tolerated by the patient.

The problems which arise in the selection of a sanatorium site, and the conditions necessary in sanatorium buildings, are thoroughly discussed. Dr. Bulstrode concludes that, with foresight and care, the erection of sanatoria with all actual essentials might be provided at a smaller cost than has hitherto been the case. This is an important conclusion, for if we are to provide adequately for the tuberculous population, many more sanatoria must be erected, and the question of money has ever been the chief difficulty in the way.

One of the most interesting chapters, which is amplified in part iv., relates to the German system of compulsory insurance as a factor in the control of phthisis. The figures given are striking, and we see here admirably exemplified the value of coordinated effort as opposed to the haphazard methods of control employed in the British Isles.

The conclusion is thrust upon us that in the control of phthisis Germany is far ahead of us. We are set an excellent example, which we would do well to follow. Our comparative failure is largely due to this want of coordination, and the waste of money and energy thereby entailed.

This part of the report concludes with a chapter on the teaching of hygiene in the public elementary schools. Tuberculosis is associated with ignorance no less than with poverty, so that there can be no question as to the importance of teaching elementary hygiene, especially so far as food values are concerned, as a means to the reduction of tuberculosis both in childhood and adult life.

In part ii. we are given a well-illustrated directory of all the public sanatoria in England and Wales, which should prove of much value for reference. This part of the report has been provided with an index, which might mercifully have been extended to the whole volume.

Part iii. is devoted to a discussion of notification of tuberculosis (voluntary and compulsory). There are as yet no data available by which the substantial utility of notification can be tested, and we must await a more extended experience before a decided opinion can be formed.

The whole volume is an admirable and comprehensive piece of work, which should be read by all those interested directly or indirectly in the problems of tuberculosis.

R. FIELDING-OULD.

THE SOCIETY OF DYERS AND COLOURISTS.

THE twenty-fourth annual general meeting of the Society of Dyers and Colourists was held at Bradford on Friday, April 3, in the large hall of the Technical College. The president, Prof. Meldola, having taken the chair, the Lord Mayor of Bradford, on behalf of the town, welcomed the meeting, and especially the distinguished foreign visitors, Prof. Liebermann and Dr. Schreiner, who were present. The president then, on behalf of the society, awarded the Perkin medal, which for this occasion had been duplicated, to Profs. Graebe and Liebermann for their synthesis of alizarin in 1868. The medal was founded by the society in 1906 in honour of the late Sir William Perkin, and in celebration of the jubilee of the discovery of mauve, the

first of the coal-tar colouring matters, the terms of its award being "for investigations, discoveries or inventions of high scientific or industrial importance applicable to or connected with the tinctorial industries."

In presenting the medals, which Prof. Liebermann received on behalf of himself and colleague, the president pointed out that this first presentation was in recognition of a discovery which, although made forty years ago, was still practically effective in enabling the tinctorial industry to be supplied with some of the most important of the artificial colouring matters. The synthesis of alizarin was of extreme scientific interest as having been the first case of the artificial production of a natural colouring matter, and it was also of particular importance as having exerted a marked influence on Perkin's career as a manufacturer and scientific investigator. Prof. Liebermann, on behalf of Prof. Graebe and himself, acknowledged the honour which had been conferred upon them, and in eloquent terms paid tribute to the memory of the late Sir William Perkin.

The president then delivered an address on the founding of the coal-tar colour industry, in which he reviewed Perkin's life-work from the technical side, and gave a history of the foundation and development of the Greenford Green factory, where all Perkin's industrial operations were conducted. On the motion of Mr. Hindley, seconded by Dr. Hertz and supported by Sir Robert Pullar, the president was thanked for his address, which was ordered to be published in the journal of the society.

In the evening the members and their guests dined at the Great Northern Victoria Hotel, the president occupying the chair, and being supported by Prof. Liebermann, the Lord Mayor, the ex-Lord Mayor, Sir Robert Pullar, Dr. C. Dreyfus, and representatives of most of the great dyeing and printing firms of the district, as well as by well-known authorities connected with the educational and scientific side of the tinctorial industry, such as Profs. A. G. Green (Leeds), W. M. Gardner (Bradford), Dr. J. C. Cain (London), Dr. Knecht (Manchester), and Mr. C. Rawson (Leicester), &c. All the officers of the society, which has its headquarters in Bradford, with sections in Manchester, the West Riding, and London, were also present. The toast of the society was proposed by the Lord Mayor, and responded to by Sir Robert Pullar. The president gave the toast of the medallists, which was enthusiastically received in both German and English forms, and to which Prof. Liebermann responded. The toast of the president was proposed by Mr. Ald. Godwin, the ex-Lord Mayor, in a humorous speech, and replied to from the chair. Dr. Schreiner, the inventor of the well-known process for "Schreinerising" fabrics, also addressed the meeting in acknowledgment of the honour done to his distinguished countrymen and to himself as a guest. As Prof. Graebe was unable through indisposition to be present at the gathering, a telegram was dispatched in the name of the society expressing regret at his absence and wishes for his speedy recovery.

ENCKE'S COMET.

THE observations of Encke's comet made at the Heidelberg Observatory deviate so strongly from the predicted places that Dr. Backlund, the director of the Pulkowa Observatory, has thought it necessary to investigate the cause. He finds that the perturbations by Jupiter, which were calculated in duplicate by H. Kamensky and Fraulein Karolikowa, have been correctly applied, so far as they depend on the first power of the disturbing force, but that in the period 1901-4 the comet approached Jupiter almost as closely as is possible, and that in consequence perturbations of the second order are very sensible. The corrections to the several elements, depending on the action of Jupiter, were as follows:—

	1st Order	2nd Order
Mean anomaly ...	+ 11° 55' 2	- 3° 34' 1
Long. perihelion ...	- 0° 8' 5	- 0° 15' 7
Long. node ...	+ 0° 4' 8	- 1° 0' 2
Inclination ...	+ 1° 2' 0	—
Excentricity ...	+ 2° 39' 8	- 1° 7' 6
Mean motion ...	+ 0° 9' 25	- 0° 3' 210

The corrections to the ephemeris, after applying the improved value of the perturbations, and taking into